GREEN FUTURE

CUSTOMER MAGAZINE FROM CHILLER OY - A TRENDSETTER IN ENERGY SOLUTIONS • 1 • 2014

Mattias Thunholm,
the manager of Tott Hotell Visby:

AIR CONDITIONING SOLUTIONS CREATE COMFORTABLE INTERIORS

▶ STABLE LABORATORY CONDITIONS FOR THE KAROLINSKA INSTITUTET ▶ INTERNATIONAL CHALLENGES OF DATA CENTRE COOLING ▶ ENERGY-EFFICIENT SERVICE CENTRE SOLUTION

RESEARCH AND DEVELOPMENT IS THE KEY TO SUCCESS

▶ FROM THE EDITOR-IN-CHIEF

Seeking to achieve the most energy-efficient end result is a challenge. In practice, duly insulating premises during the winter requires the use of cooling in the summer months. This challenge provides an interesting opportunity for equipment manufacturers–a single unit can efficiently combine both heating and cooling functions. Such solutions achieve an excellent level of efficiency. At Chiller, we have created many of precisely these kinds of products and solutions, which are presented in more detail in this magazine.

No matter what state the world's economy is in, R&D is not an area to try and save money on. Investing in R&D is smart even in harder times–even if it costs money. When a product or solution is launched it must bring something new and exciting to the marketplace.

The very existence of our company is founded on continuous R&D. For example, the right indoor air temperature and low acoustic levels of certain equipment have been influential factors in developing products such as those in our family of ceiling solutions.

Our BOX Vari™ and Grand Vari™ products are good examples of energy-efficiency, and, in addition to saving money, they also make it possible to reduce systems-level energy consumption. In developing our services we have decisively reduced our clients' maintenance costs and improved the productivity of our own personnel. R&D must always be customer-oriented.

Chiller solutions meet the needs of our clients, large or small, wherever they are in the world. At the 2013 BIG 5 International Building and Construction Show, held in Dubai, we presented our solutions for areas in which air cooling is really needed. Innovative air conditioning solutions developed for the most demanding environments are highly-valued in the Middle East. Our unique Grand Vari™ hotel concept attracted a lot of attention at the show–our competitors have nothing like it.

Functional communications and data transfer services necessitate the building of new and larger data centres. The hope is that the same solutions will also be available in Finland –bringing low-cost cooling and safe electricity to the nation. We rose to just this type of challenge in Poland too; more about which you can read in this edition of Green Future magazine.

I wish all the readers a sunny summer!

Heikki Lahdenperä
Managing Director, Chiller Oy

Image: Pauli Juppi

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CHILLER OY'S CUSTOMER MAGAZINE, GREEN FUTURE

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CHILLQUICK GREEN™ - NEW GENERATION OF OUTDOOR WATER CHILLERS

ChillquickGreen™
Superior in Energy Efficiency

The Chillquick Green™ is a new series of outdoor water chillers. They achieve notably high level of efficiency.

As a leading manufacturer *of free cooling water chillers, Chiller Oy has brought a totally new cooling concept to the market, the Chillquick Green™. Thanks to over 20 years' experience of free cooling units*

Particular attention has paid to the components of the units, as the special environmental conditions of Northern Region. A remarkable solution is e.g. the free cooling coil which is connected with coil using refrigerant. This solution brings great efficiency rate. Units also have the new controlling system and logic.

The Chillquick Green™ water coolers are manufactured with several variations of the main structure. The cooling output ranges from 25 to 650 kW and, by combining the modules, can even reach several megawatts.

ServiceNext™
Overall Concept

The Chillquick Green™ water coolers have been connected with the Chiller Service Next™ Overall Concept which offers remote service, life-cycle control and technical optimization.

THE NEW STRUCTURE

- ***45% higher coefficient of performance.***
- ***The pressure loss is 25% less.***
- ***35% less weigh.***
- ***30% less refrigerant.***

Read more: www.chiller.fi/waterchillers

SMART Vari™
Optimized Air-Conditioning

REVOLUTIONARY SMART VARI™ PRECISION AND CLOSE CONTROL UNITS

Smart Vari™ system solutions offer an optimal air-conditoning, meaning they are now capable of producing a notably higher cooling output than was previously possible. The units are fitted with one or more radial blowers with EC-motors.

The water coil units come in three models S, L, and XL. The S type has a cooling output of 3–20 kW, the L type 25–125 kW and XL type 20–100 kW. L type has been optimized for use in 7/12 °C water and The Smart Vari™ XL type for 8/18 °C remote water cooling.

SMART VARI™ -PROPERTIES

- ***Radial blowers with EC motors.***
- ***Combining multiple cooling devices into a standard machine.***
- ***Adjustable blowing direction, up or down***
- ***Air intake from the rear, front or above.***
- ***Emergency cooling system as standard.***
- ***Cooling, heating, humidifying and de-humidifying functions.***
- ***Chiller Service Next™ optimization and maintenance system as standard.***

Read more: www.chiller.fi/smartvariclosecontrol

TEAK ENTERS THE BOX VARI™ ERA

▶ Text: Dakota Lavento ▶ Images: Juha Loikkanen

Connecting the Theatre Academy's premises to the district cooling network, helping it escape the clutches of the summer sun, was achieved with Chiller's Box Vari™ cassette fan coil.

▲ *The Chiller BOX Vari™ 120 water cassette coil on the roof of the Theatre Academy's wardrobe department.*

◀ *Head of Operations Antti Halm (left) and Head of Theatre Training & Deputy Occupational Safety Manager Jyri Pulkkinen have both become familiar with the challenges of renovating an air conditioning system thanks to the project.*

The TEAK Theatre Academy, part of the University of the Arts, is situated in the Sörniäinen area of Helsinki. Over the course of recent decades, the former industrial area on the coast has been transformed into a vibrant cultural centre.

– This is truly a wonderful location, admits Head of Theatre Training **Jyri Pulkkinen**.

The Theatre Academy premises are spread over two buildings on the Sörniäinen campus. The lighting and sound design programmes are convened at the TeaK Vässi and Teak Kokos sites.

FUNCTIONAL BUT HOT

The challenges and potential heating issues were clear when the old soap factory was converted into the Theatre Academy. Hence, the decision was made to install inlet air cooling. It soon became apparent, though, that the system was nowhere near powerful enough for a south-facing space. This was especially the case in, for example, the wardrobe department, where the ironing and pressing process generates a lot of steam.

In addition to the wardrobe department, the Theatre Academy is home to other spaces in which the levels of heat generated are particularly high. Rehearsals, dancing, and exercise are sweat-inducing work, even in winter.

INCREASING THE COOLING OUTPUT

Helsingin Energia's district cooling network currently serves almost the entire capital city area, making it the obvious solution. As the Theatre Academy is the holder of a WWF Green Office status, environmental factors had to be taken into account during the whole engineering and design process for the air conditioning renovation

Chiller's fan coils were installed to support the inlet air cooling due to the size of the thermal stress in the spaces. These were particularly needed in the open plan areas, the library, and the wardrobe department. The Theatre Academy's woodwork and metal workshops did not fall under the remit of the current renovations, as they produce a lot of dust and gas inhalants that require their own roof fan and other specialist solutions.

– It may be the case that we have to consider increasing the cooling output with regards to these spaces, notes Head of Operations **Antti Halm**.

PP-Putki Oy carried out the air conditioning contract during summer 2013. The total cooling requirement for the 16,000 m^2 premises is 350 kW. Two separate heat exchangers were installed for the district cooling; the smaller of which was a 60 kW supply for the air inlet cooling, and the larger a 290 kW supply for the fan coil circuit.

NEEDS-BASED COOLING

In total, 54 Chiller BOX Vari™ cassette fan coils were installed in the Teak Kokos building. The product choice was affected by their unrivalled energy-efficiency, quiet operating level, and adjustability. Thanks to its EC grille and motor, the device uses only 6 W of energy in a normal room–the same as it takes to light a single LED bulb.

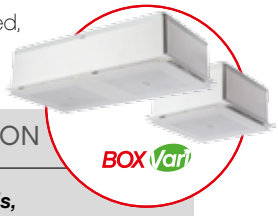
The decisive factor in choosing the water cassette fan was the size of the Chiller units, which makes them suitable for use in district cooling. Terminal devices can be dimensioned for big changes in input and output water temperature: Helsingin Energia's district cooling uses +10/18 degrees.

Chiller's cassette coils are unbeatable when it comes to spaces where the indoor air is cooled by both air circulation and fan coil units. They are used, for example, in modern shopping centres, office spaces, schools and universities, and hotels. In these kinds of premises, the conditions and cooling requirement in different areas can vary because of the nature of the activity therein, and even because of the lighting. Therefore, ventilation alone is not usually a viable solution.

A CHALLENGING CONTRACT

The renovation of the TeaK Kokos building's air conditioning was carried out in the summer. The Theatre Academy is still open at this time, though. This meant that the work had to be done in ways that did not impinge on the normal running of the Academy.

– We had agreed-upon times for the noisiest work such as diamond-tipped drilling on joists and pipes. The work was completed in good spirits and everyone was satisfied, reveals PP-Putki Oy's **Joni Peltola**. •



THEATRE ACADEMY, HVAC SOLUTION

- ***54 BOX Vari™ 60 and 120 cassette fan coils, dimensioned for district cooling.***
- ***Pipe fitter: PP-Putki Oy***

- ***Read more: www.chiller.fi/air-conditioning, www.chiller.fi/references***

WORKING TO END LIFELONG SUFFERING

▶ Text: Kerstin Lundell ▶ Images: Jens Lasthein

InDex Pharmaceuticals' project to invent a cure for ulcerative colitis and lifelong suffering places huge demands on the company's organisation, its equipment, and the indoor temperature in the laboratory. Chiller's solutions enable the exact control of conditions.

It's chilly at InDex Pharmaceuticals' laboratory in Solna, Sweden. The company develops drugs for inflammatory diseases, and it is in the laboratory that ideas take shape.

– Our company is not in the business of producing "things" like companies in other industries. Instead, our our primary focus right now is on clinical trials," says **Pernilla Sandwall,** the company's COO, tasked with ensuring the ideas evolve into something that can be used and brought to market.

The circular building she works in was built for companies that develop pharmaceuticals and other healthcare products, and is part of the Karolinska Institutet Science Park, or KISP. Two of the buildings – Alpha and Beta – were the first to be completed, and they are now home to companies like Swedish Orphan Biovitrum, Karo Bio, and Karolinska Development AB.

InDex Pharmaceuticals moved into the Gamma building in October 2013. Kappaproct, which the company hopes will be its main product, is being developed for patients who suffer from severe intestinal disorders.

Charlotte Admyre, Deputy Research Director, works in the lab an average of one day a week. Chiller's fan coils maintain the necessary condition.

Pernilla Sandwall, COO of Index Pharmaceuticals. Her job is to ensure that the work carried out in one of the circular buildings results in an approved drug.

NOBEL PRIZE-WINNING IDEA

The idea was born out of Nobel prize-winning research being pursued further by researchers at the Karolinska Institute. Pernilla holds a pharmacist's degree from Uppsala University, and is one of seven employees at the company, several of whom hold PhDs. The company has also retained 11 subcontracted experts, most of them with doctoral degrees.

The work was begun in the late 90s and is still in progress. Right now, the drug is being administered on a trial basis to patients at 40 clinics around Europe, with others receiving a placebo. Once the final results are in from the last patient, those who participated in the study will find out who received what, allowing the results of the drug to be compared to that of the placebo. Governments the world over have rigorous rules in place that must be complied with, and it is important that the study be carried out correctly.

Chiller's Studio™ Vari fan coils ensure that the temperature in the laboratory does not rise above a level acceptable for the handling of cell samples.

– It's huge if it gets approved. It would be great for the patients and for InDex, and I think it would be nice for the Swedish pharmaceutical industry as well," says Pernilla Sandwall, who previously worked for a large American company.

Analysis of the cell samples demands consideration, accuracy, and cool conditions. Pernilla Sandwall and Charlotte Admyre examine the results.

"We require a certain temperature and stabile conditions in here, preferably around 20 degrees Celsius", says Deputy Research Director Charlotte Admyre.

– But they won't have a definite answer before the second quarter of this year. Favourable results would be very big news, which will hopefully allow the project's financiers, including SEB, the Industrial Development Fund and the Norwegian firm Neomed, to get a return on their investment.

PROXIMITY TO RESEARCH

Apart from the laboratories and company management, there's very little in Solna. The substance used in the trial is manufactured in the US, and is then shipped to Umeå for packaging in glass vials. The company's expert consultants are also spread all over the world.

The overall idea is the brainchild of nearby researchers at the Karolinska Institute. This is why the company chose KISP when it was time to move.

– It's highly practical for companies like ours to do business here, says Deputy Research Director **Charlotte Admyre**, who joins our conversation in the lab. Charlotte holds a doctorate in immunology.

STRICT DEMANDS FOR LABORATORY INDOOR CLIMATE

With all the apparatus, fume hoods and test tubes, the laboratory is so essential to the company's operations that it is located right next to the office in a well-cooled space, equipped with Studio Vari™ fan coil cooling units provided by Chiller. They take care of the lab's cool indoor temperature.

– We require a certain temperature and stabile conditions in here, preferably around 20 degrees Celsius, she says.

INTERESTING FUTURE

If the clinical trials are a success, the idea behind Kappaproct will be expanded to respiratory illnesses, among other applications.

– This is really quite a big year for us. It's like putting together a big puzzle; there can't be anything missing, and everything has to fit together just right, Pernilla Sandwall sums up. •

KAROLINSKA INSTITUTET, HVAC SOLUTION

- ***200 Studio Vari™ fan coils***
- ***Supplier: Chiller Sverige AB***

- ***Read more: www.chiller.fi/air-conditioning, www.chiller.fi/references***

SERVICE NEXT™ -OVERALL CONCEPT

▶ Text and images: Chiller Oy

The Service Next™ Overall Concept explodes the unit into components and compares their limit values to BMS's variable information. Unit's coefficient of performance will be optimized and thermal conditon will be controlled by anlyzing them. Savings can be reached only by measuring and analyzing.

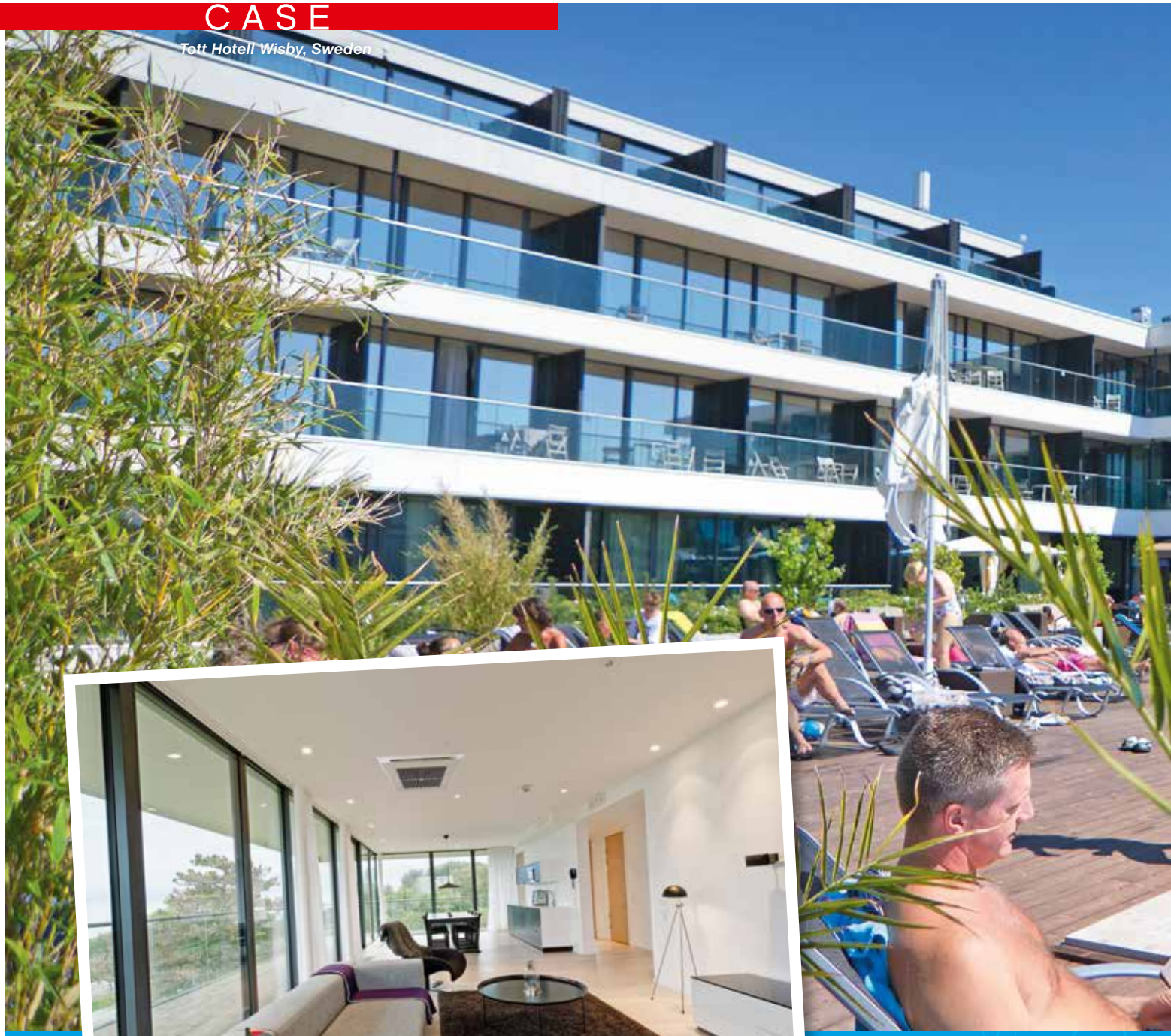
Service Next™ Overall Concept provides reports on, e.g. energy consumption, alarms, refrigerant leaks and utilization rates. Chiller Hepldesk includes also to the concept. Installations, start ups, spare parts and service belongs to the tailor-made service.

Services based on supervision, electrical documentation and reporting bring savings. Chiller's Customer Portal and transparency of the service actions are the corner stones of the concept. Remote supervision demands the Internet connection between the unit and Chiller Help Desk.

All events, regulations and disorders will be stored in the systems database. They will help to prevent unit malfunction and optimize the unit's functions to the best possible range of coefficient of performance. Knowledge about those factors allows the lifecycle control and optimization. Savings can be reached only by measuring and analyzing. •

▶ ***Read more: www.chiller.fi/servicenextconcept***

Tott Hotell Wisby, Sweden



A view instead of a wall. The hotel architecture is designed to emphasise closeness of the sea.

The expectations offered by the hotel are high, fulfilling its promise to offer something special.

CLOSE TO NATURE

▶ Text: Kerstin Lundell ▶ Images: Magnus Östh / Hotell Tott

Tott Hotel Visby's rooms are bright and the large windows provide beautiful views. However, they require a lot of air conditioning; the cooling output has to be adequate while the energy consumption is as optimised as possible. Chiller's units handle the hotel's heating and cooling during the important summer season in such a way that no one even notices they are there.

Guests at the Tott Hotel Visby in Gotland get to see the coast and the sometimes blue, other times grey, Baltic Sea through the hotel's floor-to-ceiling windows. On a good day, the hotel interior is flooded with plenty of sunlight.

– The air conditioning units are mainly called upon for cooling. Naturally, the hotel also needs heating; for example, in the rooms we hire out for events and functions during holiday periods or on other special occasions such as All Saints' Day in November, when Gotland is home to the Grand National motorcycle race, says Hotel Manager **Mattias Thunholm**.

– The hotel has one liquid cooling unit in the basement area, which is used on warmer days. The colder period, out of season, is taken care of by district heating.

NOT YOUR AVERAGE NIGHT'S STAY

The levels of comfort offered by the hotel are high, fulfilling its promise to offer something special. Among other things, the hotel

Hotell Tott Wisby, Sweden

"The low level of noise was the most significant reason for us choosing Chiller's BOX Vari™ for the ceiling-mounted air conditioning solution", hotel manager Mattias Thunholm underlines.

has a 125 square metre suite and a roof terrace equipped with a jacuzzi. During the high season, the suite costs SEK 10,000 per night, with a standard room costing SEK 1,999.

– Our guests are both corporate clients and private individuals who want to enjoy the Gotland summer a comfortable distance from the island's largest town. During the Almedalsvecka event organised in Almedal, the hotel is filled with politicians and lobbyists.

The decor in the rooms is characterised by straight lines with a grey and black colour scheme. The hotel refers to itself as a design hotel.

– The architecture has been carefully designed to emphasise the best aspects of the hotel's proximity to the sea, is the description on the hotel's website.

Among other things, this means that the air conditioning equipment is integrated in the walls and ceilings so as not to interfere with the look of the rooms. A particular challenge, here, was the fact that the hotel rooms do not have as many solid walls as a normal building; many of the walls are, in fact, windows.

Naturally, air conditioning equipment cannot be too noisy. This was the most significant reason for us choosing Chiller's BOX Vari™ for the ceiling-mounted air conditioning solution and the Chiller Studio Vari™ of fan coils for the wall-integrated system. The air conditioning equipment in the rooms is capable of producing 3 kW of cool and 1 kW of warm air.

A PROBLEM-FREE YEAR

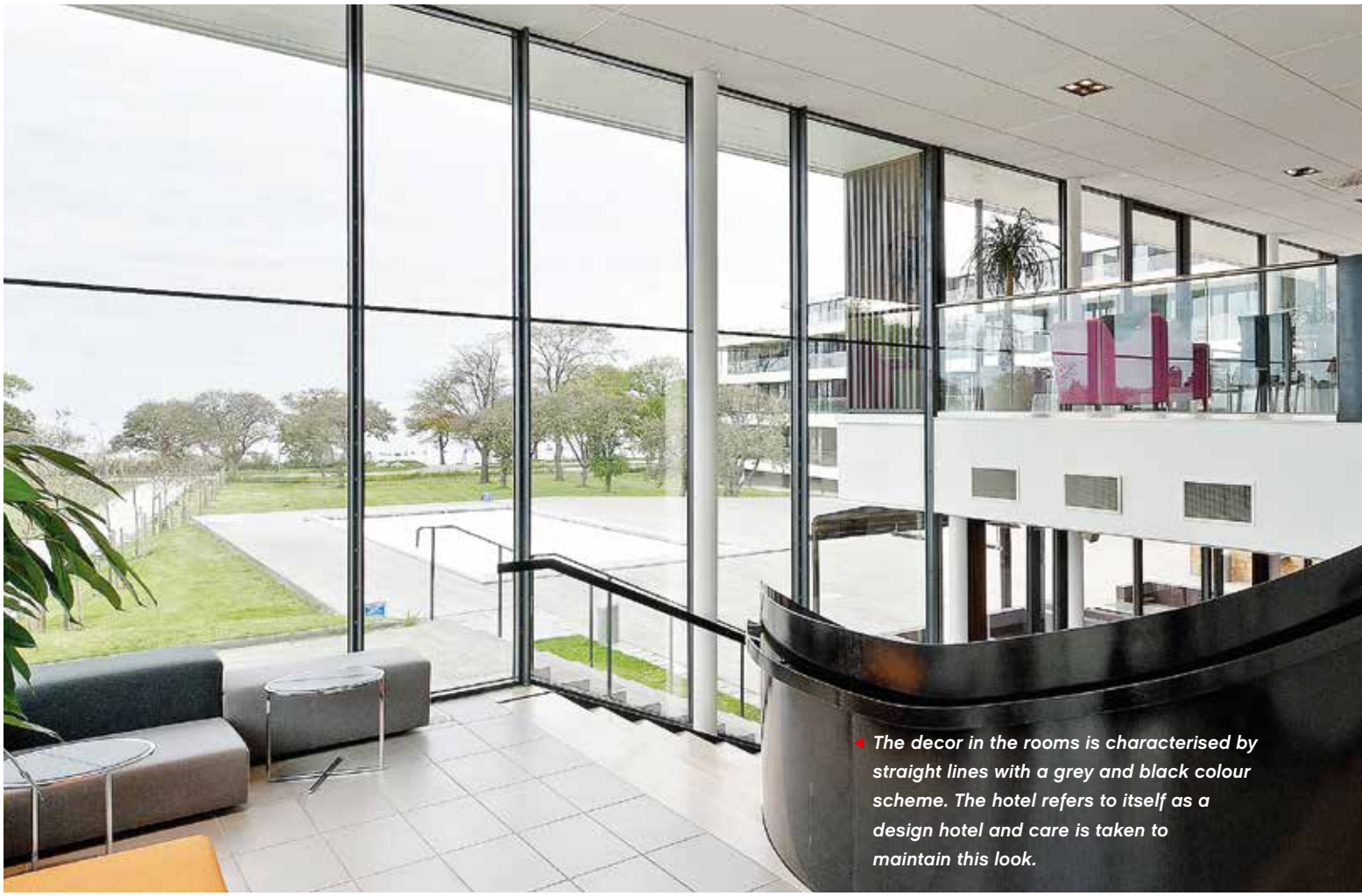
The air conditioning equipment have done their job for a whole year, without impinging on the everyday ambience of the hotel.

If you don't think about them, you don't even notice they're there, remarks Hotel Manager Thunholm.

The ease of maintenance also affected our decision to use Chiller's air conditioning units. According to Caverion's project manager for the system implementation, **Olof Olofsson**, there are rarely any faults in Chiller's products.

– Fault-free operation is extremely important, because the unit is integral to the interior architecture. For this reason, the long life cycle of units becomes even more important, says Olofsson.

– Another crucial factor affecting the choice of equipment was the supplier's ability to live up to its promises and deliver the equipment on time, he continues.



The decor in the rooms is characterised by straight lines with a grey and black colour scheme. The hotel refers to itself as a design hotel and care is taken to maintain this look.

REQUESTING MAINTENANCE SERVICE VIA TEXT MESSAGE

The system was installed outside of peak season, during which time the hotel was mostly empty. The system did not present any technical problems during the year after its installation. The air conditioning equipment was connected to the KNX premises alarm system, which alerts the maintenance personnel to any faults via text message. Each room is equipped with a connector for all of the primary devices and thermostats.

The premises alarm system was already in place when the air conditioning equipment was installed and Caverion made the necessary modifications. The cables were also replaced at this time, owing to the fact that the previous air conditioning system was installed in the floor. The old system had to be replaced as it produced condensation. When the air conditioning system was moved from the floor to the walls and ceilings, the plumbing network also needed to be modified. Now, the pipes are also invisibly integrated in the walls.

– The pipes are fitted with condensation insulation. If, however, something does go wrong, the equipment can be accessed through the walls, notes Olof Olofsson.

Gotlands Konferens och Turistservice AB, Mattias Thunholm's employer, has been given the job of taking care of the hotel reservations. The work doesn't stop outside peak season, when the hotel is practically closed; the staff are still on hand to guarantee the same high standards of service for the owners.

The hotel was opened in 2008 and it is the municipality's solution to the need for high-quality hotel accommodation in the Visby area. It was built on a former campsite and is a 15-minute walk from the north of the city of Visby. •

Air conditioning units are integral to the interior architecture.

"If you don't think about BOX Vari™ cassette fan coils, you don't even notice they're there", remarks Hotel Manager Mattias Thunholm.

TOTT HOTELL VISBY, HVAC SOLUTION

- ***60 BOX Vari™ Cassette fan coils, dimensioned for remote cooling.***
- ***70 Studio Vari™ fan coils***
- ***Supplier: Chiller Sverige AB***
- ***Pipe fitter: Caverion***

Read more: www.chiller.fi/air-conditioning, www.chiller.fi/references

Kauklahti Life and Living Centre for Senior Citizens

A SCALABLE GEOTHERMAL HEATING AND COOLING SOLUTION

▶ Text: Dakota Lavento • Images: Jyri Laitinen

The residents of the Espoo-based life and living centre for seniors enjoy pleasant indoor conditions and can keep the heating in their own rooms at a comfortable level. Underfloor heating and cooling is handled by a Chillquick Thermo™ geo-energy heating pump.

The Kauklahti Life and Living Centre for Senior Citizens, completed in 2012, is an exemplary sheltered housing complex in many ways. It is the first housing solution for senior citizens in Espoo to use the new 'life and living' concept for sheltered accommodation. Similar centres are to be built in different parts of the city.

EXCELLENT LIVING CONDITIONS

The building work for the Kauklahti senior centre began in 2010, and the first residents moved in on 21 May 2012. The main contractor for the site was SRV Rakennus Oy. The HVAC design was carried out by Asplan Oy Engineering and the contract work by Lemminkäinen Talotekniikka Oy. According to HVAC engineers **Reijo Auvinen** and **Juhani Järvinen**, it was an interesting project, the planning of which began in 2008.

– The engineering solutions emphasised energy-efficient indoor conditions without impinging on functionality, says Järvinen.

ADVANCED BUILDING AUTOMATION

The site is equipped with an advanced building automation system. It's possible to set room-specific temperatures; the floor temperature, air temperature, and bathroom temperatures can be adjusted by the in-room sensors, with residents also able to make micro-adjustments of two degrees up or down. The system is set up with underfloor heating/cooling solution, which requires an efficient control.

– Older people generally prefer slightly warmer room temperatures. The monitoring system used in the seniors centre indicates that the room temperatures are often +23 degrees, says Järvinen.

According to him, the monitoring system has made it notably easier to make adjustments during the warranty period.

AN ENERGY-EFFICIENT SYSTEM

The geo-energy field in the Kauklahti Life and Living seniors' centre contains eighteen 200-metre deep heat wells. A solution of water and ethanol is used as a preventative mechanism against heat build-ups. If needed, the heat pump unit supplements the underfloor heating in the premises during the winter. In summer, the geothermal energy is used primarily for free cooling and the heat pump is used in reverse as a complementary device for cooling during periods of peak intensity.

The Chillquick Thermo™ is a geothermal heat pump, with a dual-circuit unit, containing four compressors, hot and cold water heaters, a liquid cooling conduit for the heat transfer units, and pumps.

The dry cooler situated on the roof of the building is set up for use during the summer months, supplying the necessary condensation capacity for technical rooms, cold rooms, and the kitchens. A water-glycol solution circulates in the liquid cooling network. The technical rooms and cold rooms in the kitchen are cooled by DX fan coil units. The DX system is liquid-cooled and condensation takes place in the liquid-cooling network.

PRECISE MONITORING

The Chiller geo-energy system is fitted with a Service Next™ Overall Concept, granting 24/7 access to the Chiller Help Desk. This allows for full systems booting and calibration online, optimising operations. The unit includes a COPtronic™ efficiency calibration and calculation system.

– Chiller monitors, checks, and reports on the unit functioning for the duration of the guarantee period, at three-month intervals. The reports indicate, for example, the fluid temperatures, thermal coefficients, and any changes made to the operating and installation settings, allowing the system to be optimised.

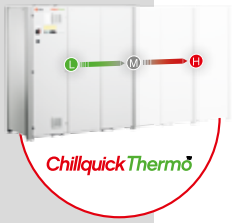
– The Kauklahti seniors centre is being used as a template for the design and construction of modern senior housing, informs Järvinen with satisfaction •

"The engineering solutions emphasised energy efficient indoor conditions without impinging on functionality", according to HVAC engineers Reijo Auvinen and Juhani Järvinen.

The geothermal energy of heating and cooling is produced by Chiller's heat pump; on cooling part by free cooling function. District heating works for back-up and auxiliary heating.

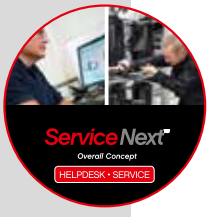
KAUKLAHTI LIFE AND LIVING CENTRE FOR SENIOR CITIZENS, HVAC SOLUTION

- ***Main contractor: SRV Rakennus Oy***
- ***Year of completion: 2012***
- ***Architectural design: Kirsti Siven & Asko Takala Arkkitehdit Oy***
- ***HVAC design: Asplan Oy Insinööritoimisto***
- ***HVAC contracting: Lemminkäinen Talotekniikka Oy***



- ***Energy system: Geothermal heating and cooling, district heating***
  - ***Total heating energy required: approx. 660 MwH***
  - ***Total cooling energy required: approx. 170 MwH***
- ***18 energy wells, total depth 200 m***

- ***Geothermal pump Chillquick Thermo™, plus hot and cold water heaters, heat transfer units for the liquid cooling conduits, heat output of the heating pump is approx. 150 kW and cooling output is approx. 100 kW.***
- ***Service Next™ Overall Concept***
- ***COPtronic™ efficiency calibration and calculation***



Read more: www.chiller.fi/heatpumps, www.chiller.fi/servicenextconcept, www.chiller.fi/references

The liquid coolers for the Chillquick™ and the Chillquick Eco™ cold water stations in the Technology Park's data centre are located behind the building complex.

ENERGY-EFFICIENCY IN THE DATA CENTRE

INTERNATIONAL CHALLENGES OF DATA CENTRE COOLING

Text: Dakota Lavento Images: Kielce Technology Park and Pawel Regulski

Chiller's cold water stations save energy for this Polish data centre. The Chiller solution was chosen owing to the efficiency of the free cooling and the Service Next™ Overall Concept.

Without fast and reliable telecommunications we wouldn't be able to operate the way we currently do – regardless of whether the system user is a corporate client, researcher or a consumer.

The headlines are usually grabbed by the giant data centres recently built in Finland by Google and the Russian company, Yandex. Smaller data centres are also being built, for example, in conjunction with new business parks, research centres, universities, and hospitals.

Owing to the need to be energy-efficient, the giant service centres are ideally located in countries in the Northern hemisphere, in order to guarantee the longest possible free cooling period. It takes a lot of electricity to cool a data centre.

SPACE FOR TECHNOLOGY FIRMS

When a business park was being built in the Kielce industrial area in Poland, the intention for the planned data centre solution was to achieve as energy-efficient a setup as possible. The setup had to utilise the most cutting edge expertise in the cooling sector in order to minimise power consumption and maximise free cooling.

The Kielce Technology Park offers business premises to startups and internationalisation-orientated Polish and international technology firms alike. The business park is home to different sizes of office, laboratory, and manufacturing and production premises, as well as shared premises for lease use; all in all, a total of 652,114 m^2.

Construction of the technology park got under way in 2008 and was completed in 2012. Preparations are already being made to expand the site, which measures 200 hectares.

RELIABLE TELECOMMUNICATIONS

The energy efficiency of the data centre cooling was a deal-breaker when selecting the system solution. The biggest energy drains are the servers, routers, and switches. The need for cooling quickly increases. In a short time, the energy needed to cool the data centre's server cabinets and rack servers has increased from 15 kW to 40 kW per rack. The technology park also needed to be prepared for rapid expansion.

The main contractor for the technology park was the IT infrastructure solutions specialist, Infover Kielce. The actual rack and cooling systems were provided by Chiller's representative in Poland, StepSystems Sp.z o.o.

AN ENERGY-EFFICIENT COOLING SOLUTION

The water needed to cool the data centre is produced by two water cooled Chiller's 100 kW Chillquick Eco™ cold water stations. The second cold water station enables free cooling. Use of the cold water stations is rotated during the summer months. During the winter months, the system is designed to make the most of the opportunity for free cooling.

– We chose Chiller's cold water stations particularly due to their high free cooling temperature, remarks project manager **Pawel Regulski** from Step Systemsis SP.

"We chose Chiller's cold water stations particularly due to their high free cooling temperature", remarks project manager Pawel Regulski.

Regulski also tips his hat to the unique and reliable Chiller Service Next™ Overall Concept.

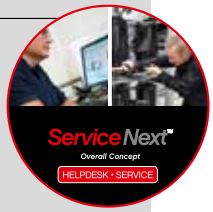
– The remote supervision allows us to make sure that the whole cooling system works the way we want it; in as energy-efficient a way as possible. By optimizing the operations of the liquid coolers, the energy efficiency of the whole cooling system is increased.

During the design and installation phases, the contractors needed to be prepared for a site expansion at a moment's notice. This meant the possibility for the installation of an extra 12 racks, to be integrated into the cooling system, as well as two more 100 kW cold water stations, without interrupting the normal operation of the data centre.

–The Kielce Technology Park is a feather in the cap for the company, confirms Regulski. •

KIELCE TECHNOLOGY PARK, HVAC SOLUTION

- ***Chillquick™ and Chillquick Eco™ -cold water stations***
- ***Service Next ™ Overall Concept***
- ***HVAC contractor: StepSystems Sp. z o.o.***



- ***Read more: www.chiller.fi/waterchillers, www.chiller.fi/references, www.chiller.fi/servicenextconcept***

PLEASANT AND DRAFT-FREE INDOOR CLIMATE

▶ Text: Heikki Lahdenperä ▶ Images: Chiller Oy

Chiller's Ceiling Product Group presents a new fan coil solution: the Studio Vari™ fan coil family. Based on EC technology, the Studio Vari™ offers a completely new, energy-efficient, and low noise solution!

Users of the Studio series are accustomed to its consistent high quality, quiet operating, and exceptional efficiency. It has been over fifteen years since we presented the first Studio units.

The fan and the coil have both been central to the product development process right from the beginning. We have never used slide bearings in our fan solutions, as experience has shown us just how bad they are in practice. Instead, our fan technology has always utilised ball bearings. Furthermore, we have always fitted the coils into the intake side of the fan, as this installation method helps us to keep the sound level even without exceeding the coil's speed setting.

STUDIO VARI™ IS A CONTINUATION OF OUR AC TECHNOLOGY

The Studio Vari™ fan coils are fitted with EC technology. The energy consumption of the units is a fraction of that of equivalent devices fitted with slide bearings and AC motors – in fact, it can be up to 85% lower. In other words, we are talking about the LED technology age of the HVAC field.

An example of this is the aforementioned Studio Vari™ 10-60, which consumes 8 W per 100 l/s of airflow. For its part, the Studio AC 10-60 consumes approximately 25 W. In contrast, an AC fan motor fitted with slide bearings consumes approximately 50 W.

These differences in energy consumption are of great significance in large plants, because the electrical energy used to power the fans also becomes a load on the cooling unit.

The depth of the coil has always been an important factor for us, especially as it can make a big difference in plants. The coil circuits are totally different in a large water temperature range than in 7/12 °C water.

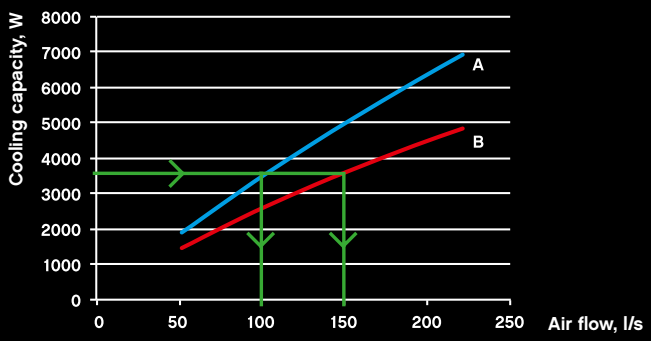
In order for a silent fan coil to be used in a mid-size fan unit, the coil needs to be fitted on the intake side of the fan. Both our Studio Vari™ and Grand Vari™ products respond to this technological challenge.

The coils used in district cooling are usually one circuit, whereas in 7/12 °C the coils are 4–8 circuit. These cannot be overlapped and it is for this reason that all modern units are manufactured to order.

THE POSITION OF THE FAN PLAYS A BIG ROLE

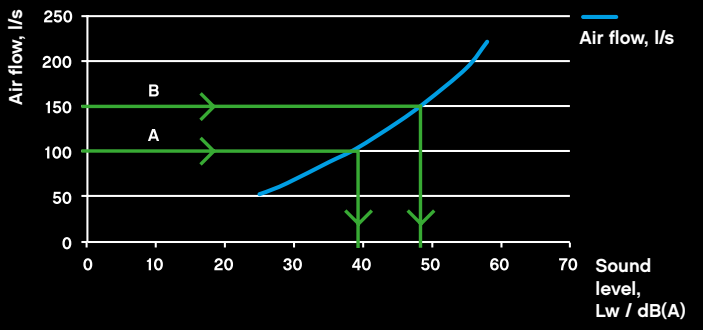
The position of the fan in relation to the coil plays a big role in the heat transfer of the coil and its subsequent noise level. A fan coil is an extremely compact product and this can lead to variations

6-DEEP COIL STUDIO 10, ON THE INTAKE SIDE OF THE FAN AND 4-DEEP COIL ON THE PRESSURE SIDE OF THE UNIT

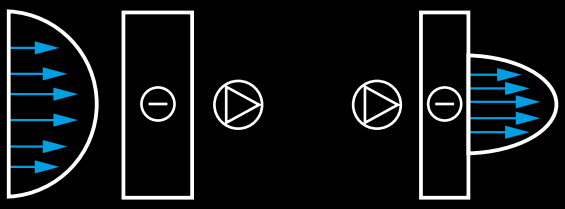


A) 6-deep coil on the intake side of the Fan.
B) 4-deep coil on the pressure side of the Fan.

SOUND LEVEL IN RELATION TO AIR FLOW



THE EFFECT OF LOCATION OF THE FAN



Chiller solution *Traditional solution*

in the noise levels it produces. When the coil is fitted on the intake side of the fan (see image), the air profile remains at a steady level. In contrast, when the coil is on the pressure side of the fan, the air goes directly through the coil, requiring an increase in the air flow in order to attain the desired cooling output.

We have experimented with the size of our Studio Vari™ 10, using a 6-deep coil on the intake side of the fan and a 4-deep coil on the pressure side of the fan. The tests were conducted using a mid-width fan. In order to get the desired cooling output of, for example, 3.6 kW, there needs to be an air flow of 100 l/s in the 6-deep coils on the intake side of the fan. The sound level with this setup is 39 dB(A).

When we fit a 4-deep coil on the pressure side of the fan in the same unit, the air flow required to achieve the desired cooling output is 150 l/s. The noise level with this volume of air is 49 dB(A). With a 10 dB difference in noise levels, it is it is easy to understand why room absorbing of 9–11 dB(A) is used for units currently on the market. •

Chiller
AIR-CONDITIONING

GRAND Vari™

A new concept for air-conditioning
in hotel rooms, offices, and villas

The new EC motor technology and the unit solution constitute a technological combination the like of which has never been seen on the marketplace. The grille of the unit consists of two sections, which enable an unprecedented logarithmic temperature difference for a heat exchanger coil.

- ***Control of valves and EC motor in the range of 0–100 %***
- ***The new EC grille enables minimal energy consumption (in the range of 3–11 W)***
- ***The new EC grille enables blowing that is completely free from draught***
- ***The filter is conveniently located behind the hinged grille and is easy to clean***

Chillquick Thermo™ is a revolutionary range of heat pumps that provide for more flexible and energy-efficient solutions. These dual function units provide both heating and cooling.

One heat pump range is enough to cover the needs of all buildings, up to 2 000 kW capacity. Chillquick Thermo™ heat pumps can be connected to the *Service Next™ Overall Concept*.

- ***Read more: www.chiller.fi/heat-pumps***

VARIABLE ENERGY-EFFICIENCY

- CHILLQUICK THERMO™ -HEAT PUMPS FOR BUILDINGS

- ***More information:***
  Chiller Oy, Louhostie 2, FI-04300 Tuusula, FINLAND
  Tel. +358 9 2747 670 · www.chiller.fi · info@chiller.fi